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# **MONTHLY REPORTING PERIOD - MAY, 2018**

#### 1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in May, 2018. Documentation and figures are provided on the following pages to support this submission.

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May 2018												
Total (US Gals)	Total (Mega Litres)											
444,059,000	1,680.76											
0	0											
21,529,000	81.49											
894,100	3.38											
466,482,100	1,765.63											
	444,059,000 0 21,529,000 894,100											

- A malfunctioning valve, used to regulate the flow between Stevens and Hadden Reservoirs, required repairs in late May. As a result, BMID was forced to utilize Hadden Reservoir's Mission Creek intake as the primary supply source for the distribution system;
- 2. The Water Treatment Plant was turned off and Stevens Reservoir was drained beginning May 23, 2018, to facilitate the required valve repair at Stevens Reservoir outlet;
- 3. Due to poor water quality in Mission Creek entering directly into Hadden Reservoir, BMID was forced to issue a Boil Water Notice beginning May 23, and lasting throughout the rest of May 2018;
- 4. Turbidity levels at the Distribution Intake remained below 1.0 NTU from May 1 to May 23, 2018. Beginning on May 24, turbidity increased as a result of raw water reaching Hadden Reservoir outlet. Peak turbidity at the Distribution Intake was 12.48 NTU on May 27, 2018;
- 5. The highest monthly turbidity level recorded at the first customer (Booster #1) was 13.20 NTU on May 27, 2018 during the BWN;
- 6. Mission Creek experienced extremely high flows as the mid to lower elevations of the watershed continued melting resulting on several high-flow events and isolated flooding;
- 7. BMID's Scotty Creek source, used for irrigation in the north-end, resumed operations on May 3, 2018;
- 8. Well #5 was used throughout May as a source for both domestic and irrigation water in the north-end of the system, in conjunction with Mission Creek system water, as determined by usage and pressures in the area;
- 9. *E.Coli* levels at Mission Creek's Point of Diversion were average during May. The highest raw water *E.Coli* count was 48 on May 22, 2018;

- 10. *E.Coli* levels at the Distribution Intake had low counts on all samples throughout early May, however the peak count of 10 occurred on May 30, 2018;
- 11. No *E.Coli* and no *Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive bacteria tests were found from the in-house presence-absence tests during routine testing;
- 12. A new dedicated sample station was installed in Solly Court and will be utilized for presence/absence testing;
- 13. BMID's Water Treatment Plant resumed normal operations on March 15, 2018. The WTP was temporarily shut down to facilitate the valve repair at Stevens Reservoir on May 23, 2018. The plant remained off-line for the remainder of the month. The WTP will remain in use throughout the spring and summer until the Mission Creek water source is of sufficient quality to by-pass treatment;

## 1.0 FLOWS - MAY, 2018

Maximum est. Daily Flow was on May 24, 2018 at 25,150,000 US gallons (95.19 ML) Minimum est. Daily Flow was on May 10, 2018 at 5199,000 US gallons (19.68 ML) Mission Creek provided 95% of domestic flow throughout May.



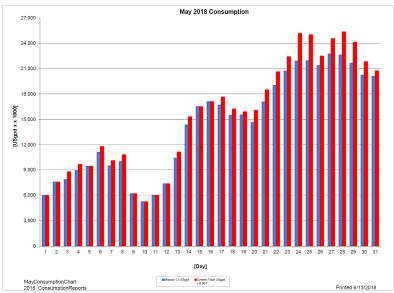


Table 1.2 - May, 2018 Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Scotty Crk	System Total	System Total	
2018	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day	
1-May	5,929,000	0	0.0	0	5,929,000	22.44	
2-May	7,527,000	0	0.0	0	7,527,000	28.49	
3-May	7,805,000	0	0.0	92,600	7,897,600	29.89	
4-May	8,881,000	0	0.0	72,500	8,953,500	33.89	
5-May	9,381,000	0	0.0	0	9,381,000	35.51	
6-May	11,027,000	0	732,000.0	0	11,759,000	44.51	
7-May	9,436,000	0	600,000.0	0	10,036,000	37.99	
8-May	9,929,000	0	810,000.0	0	10,739,000	40.65	
9-May	6,148,000	0	0.0	0	6,148,000	23.27	
10-May	5,199,000	0	0.0	0	5,199,000	19.68	
11-May	5,965,000	0	0.0	0	5,965,000	22.58	
12-May	7,317,000	0	0.0	0	7,317,000	27.69	
13-May	10,330,000	0	724,000.0	0	11,054,000	41.84	
14-May	14,310,000	0	975,000.0	0	15,285,000	57.85	
15-May	16,483,000	0	0.0	0	16,483,000	62.39	
16-May	17,077,000	0	0.0	0	17,077,000	64.64	
17-May	16,673,000	0	950,000.0	0	17,623,000	66.70	
18-May	15,482,000	0	721,000.0	0	16,203,000	61.33	
19-May	15,493,000	0	384,000.0	0	15,877,000	60.09	
20-May	14,603,000	0	1,433,000.0	0	16,036,000	60.70	
21-May	17,033,000	0	1,441,000.0	0	18,474,000	69.92	
22-May	18,995,000	0	1,620,000.0	0	20,615,000	78.03	
23-May	20,693,000	0	1,690,000.0	0	22,383,000	84.72	
24-May	21,874,000	0	3,276,000.0	0	25,150,000	95.19	
25-May	21,914,000	0	1,555,000.0	152,500	23,621,500	89.41	
26-May	21,342,000	0	0.0	112,300	21,454,300	81.20	
27-May	22,723,000	0	1,206,000.0	60,000	23,989,000	90.80	
28-May	22,588,000	0	1,990,000.0	75,200	24,653,200	93.31	
29-May	21,641,000	0	1,422,000.0	104,000	23,167,000	87.69	
30-May	20,199,000	0	0.0	160,000	20,359,000	77.06	
31-May	20,062,000	0	0.0	65,000	20,127,000	76.18	
Totals Usgpd	444,059,000	0	21,529,000	894,100	466,482,100	1765.63	
Totals ML	1,680.76	0.00	81.49	3.38			
Avg's	14,324,484	54.22			15,047,810	56.96	
Max	22,723,000	86.01			25,150,000	95.19	
Min	5,199,000	19.68			5,199,000	19.68	

### 2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination

Samples were taken twice per week at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion; one sample is taken per week at Stevens Pond outlet (point halfway between WTP Outlet and Distribution Intake).

Samples from the previous month are also provided to show a two month trend

Figure 2.1 - E.Coli Readings (CARO Lab results) April 2018 - May 2018

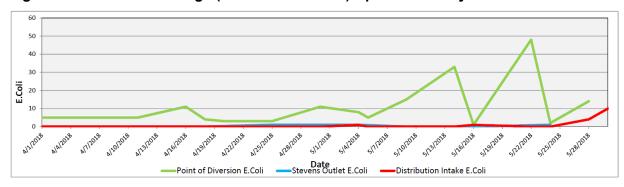


Table 2.2 - E.Coli Readings (CARO Labs)

	Point of Diversion	Stevens Outlet	Distribution Intake
Date	E.Coli	E.Coli	E.Coli
1-Apr-18	5	0	0
4-Apr-18	5	0	0
11-Apr-18	5	0	0
16-Apr-18	11		0
18-Apr-18	4	0	0
20-Apr-18	3		0
25-Apr-18	3	1	0
30-Apr-18	11		0
4-May-18	8	1	1
5-May-18	5		0
9-May-18	15	0	0
14-May-18	33		0
16-May-18	1	0	1
22-May-18	48		0
24-May-18	2	1	0
28-May-18	14		4
30-May-18			10

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek

Stevens Outlet (Raw) - Sampling point after exiting 142,000 m<sup>3</sup> 1st upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m<sup>3</sup> 2<sup>nd</sup> lower balancing reservoir (Hadden Res.)

(Hadden Outlet = Distribution Intake - Point of Disinfection)

### 3.0 RAW AND TREATED WATER TURBIDITY

Turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher's Road, the first-customer, through May 2018. The highest turbidity recorded at this location was 13.20 NTU on May 27, 2018.

Figure 3.1 – Daily Turbidity Readings (Distribution Intake and Booster Station 1)

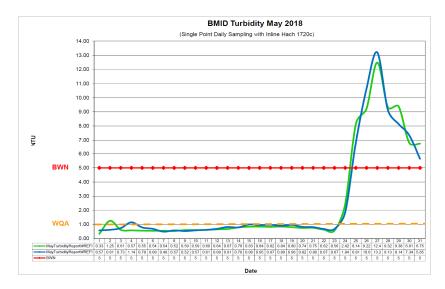


Table 3.2 - Daily Monitoring Record - Turbidity at Distribution Intake & Bst Stn 1

	Turbi	dity Point Samplin	g for May 2018	
Date	Distrib	oution Intake	Booster#	1- First User
Date	Sample Time	[NTU]	Sample Time	[NTU]
1	8:54 AM	0.33	8:03 AM	0.57
2	12:22 PM	1.25	3:17 PM	0.61
3	8:41 AM	0.61	8:03 AM	0.73
4	8:54 AM	0.57	7:53 AM	1.14
5	10:50 AM	0.55	10:18 AM	0.78
6	9:42 AM	0.54	9:20 AM	0.68
7	2:51 PM	0.54	2:26 PM	0.48
8	8:58 AM	0.52	8:02 AM	0.57
9	9:02 AM	0.59	8:13 AM	0.52
10	8:32 AM	0.59	7:50 AM	0.57
11	8:29 AM	0.60	7:51 AM	0.61
12	6:00 AM	0.64	7:28 AM	0.68
13	7:15 AM	0.67	6:46 AM	0.81
14	9:01 AM	0.78	8:11 AM	0.78
15	3:22 PM	0.83	9:20 AM	0.99
16	9:07 AM	0.84	8:18 AM	0.95
17	9:27 AM	0.82	9:09 AM	0.97
18	8:54 AM	0.84	8:18 AM	0.89
19	12:30 PM	0.80	11:51 AM	0.96
20	11:45 AM	0.74	11:20 AM	0.82
21	12:05 PM	0.75	11:30 AM	0.80
22	9:40 AM	0.62	8:47 AM	0.67
23	8:43 AM	0.56	8:07 AM	0.67
24	8:55 AM	2.42	8:05 AM	1.84
25	9:11 AM	8.14	8:13 AM	6.81
26	7:43 AM	9.22	7:26 AM	10.64
27	8:44 AM	12.48	8:22 AM	13.20
28	8:42 AM	9.32	8:03 AM	9.13
29	10:23 AM	9.38	9:43 AM	8.14
30	8:57 AM	6.81	8:17 AM	7.34
31	8:28 AM	6.75	7:56 AM	5.65
AVG		2.66		2.58

### 4.0 CHLORINE CONTACT TIME

Temperature, pH, current flow and chlorine residual levels are recorded to determine the CT levels that are required to provide 3 log inactivation of *Giardia*. Chlorine Contact times exceeded the CT levels required to provide 3 log (99.9%) inactivation of *Giardia Lamblia* throughout the month of May, 2018.



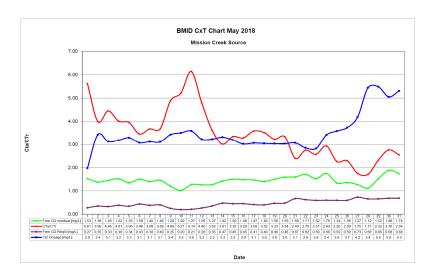


Table 4.2 - CT Table - Mission Creek Source

	BMID May 2018													
							sion Cre		ce					
	рН	TEMP	PEAK	Free Cl2	СТ	СТ	CTa/CTr	Free Cl2		VOLUME	TIME	FLOW	CL2 DOSAGE	
DATE	(highest)	(lowest)	FLOW	residual	achieved	reg'd		Reg'd	Dosage	TOTAL		PRESENT	PRESENT	
May	(g	[°C]	[Usgpm]	[mg/L]	40010	1044		[mg/L]	[mg/L]	[USgal]	[mins]	[Usgpm]	[PPD]	
1	7.67	14.1	6255	1.53	648.1	115.4	5.61	0.27	2.0	2649600	424	4471	106	
2	7.65	13.1	7569	1.38	483.1	121.0	3.99	0.35	3.4	2649600	350	5243	216	
3	7.64	13.2	7158	1.45	536.7	120.6	4.45	0.33	3.1	2649600	370	6226	234	
4	7.59	13.7	8714	1.52	462.2	115.3	4.01	0.38	3.2	2649600	304	7321	280	
5	7.54	13.6	8075	1.35	443.0	112.0	3.95	0.34	3.3	2649600	328	6365	252	
6	7.47	14.1	10721	1.50	370.7	107.2	3.46	0.43	3.1	2649600	247	6955	257	
7	7.41	14.7	10132	1.40	366.1	99.6	3.68	0.38	3.1	2649600	262	5522	207	
8	7.39	14.6	10500	1.46	368.4	100.2	3.68	0.40	3.1	2649600	252	6954	260	
9	7.26	14.8	7115	1.20	446.9	91.5	4.89	0.25	3.4	2649600	372	3008	124	
10	7.24	14.5	5733	1.02	471.4	90.5	5.21	0.20	3.5	2649600	462	2587	109	
11	7.18	14.3	5916	1.27	568.8	92.7	6.14	0.21	3.6	2649600	448	3292	142	
12	7.16	14.2	7519	1.26	444.0	92.5	4.80	0.26	3.2	2649600	352	5181	201	
13	7.14	14.7	10468	1.27	321.5	88.8	3.62	0.35	3.2	2649600	253	4020	156	
14	7.05	15.3	14919	1.42	252.2	83.7	3.01	0.47	3.3	2649600	178	9482	378	
15	6.95	16.2	15565	1.50	255.3	76.3	3.35	0.45	3.2	2649600	170	10283	395	
16	6.89	15.9	15704	1.48	249.7	76.0	3.29	0.45	3.0	2649600	169	10086	366	
17	6.85	15.5	14149	1.47	275.3	76.8	3.58	0.41	3.1	2649600	187	10707	394	
18	6.81	14.2	12824	1.40	289.3	82.1	3.52	0.40	3.0	2649600	207	11532	422	
19	6.88	13.0	13265	1.50	299.6	92.7	3.23	0.46	3.0	2649600	200	12768	466	
20	6.93	12.8	13051	1.59	322.8	96.7	3.34	0.48	3.0	2649600	203	9851	359	
21	6.97	12.7	17866	1.60	237.3	99.0	2.40	0.67	3.1	2649600	148	10878	401	
22	6.95	13.3	17324	1.71	261.5	95.2	2.75	0.62	2.9	2649600	153	12404	425	
23	6.95	13.8	17345	1.52	232.2	90.3	2.57	0.59	2.8	2649600	153	15246	517	
24	6.90	13.8	17479	1.75	265.3	90.5	2.93	0.60	3.4	2649600	152	14472	594	
25	6.85	13.2	17666	1.34	201.0	88.9	2.26	0.59	3.6	2649600	150	13881	598	
26	6.85	12.9	17261	1.36	208.8	90.9	2.30	0.59	3.7	2649600	154	13871	622	
27	6.80	11.6	19905	1.27	169.1	96.6	1.75	0.73	4.2	2649600	133	14870	747	
28	6.73	11.5	18705	1.12	158.7	92.8	1.71	0.66	5.4	2649600	142	16184	1058	
29	6.71	10.7	17041	1.52	236.3	101.9	2.32	0.66	5.5	2649600	155	16083	1060	
30	6.70	10.1	16545	1.88	301.1	109.2	2.76	0.68	5.0	2649600	160	12145	737	
31	6.73	9.7	16156	1.74	285.4	112.3	2.54	0.68	5.3	2649600	164	12703	810	

### 5.0 WATER DISTRIBUTION SAMPLING (TREATED)

### Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at eight locations around the BMID service area
- 41 samples were found to be absent of Coliforms.
- 41 samples were found to be absent of *E.Coli*.

Table 5.1 - CARO Independent Lab

	PR	V 7	Boos	ster 1	Ellison E	llison Blow-Off Ellison School		612 Adams Rd		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Wel	II #5	
Date	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
4-Apr-18	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0
11-Apr-18	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0
18-Apr-18	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0
25-Apr-18	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0
4-May-18		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
8-May-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
24-May-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
30-May-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-

Testing - Total Coliforms - E.Coli

### In-House Analysis (BMID Staff)

- Presence/Absence samples taken on a three week cycle at ten sites around the BMID service area.
- All samples were found to be absent of both Total Coliforms and E.Coli.

Table 5.2 - BMID In-house Testing - Presence Absence

		5/7/2	2018		5/14/2018				5/22/2018				5/28/2018			
Location	CI2	Temp.	Pres.	Abs.	CI2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	CI2	Temp.	Pres.	Abs.
Sylvania Cres	0.68	11.0	-	Χ									0.08	15.0	-	X
170 Kneller Rd					0.50	13.4	-	X								
2105 Morrison	0.91	10.6	-	X									1.07	13.0	-	X
Pearson School									1.44	12.0	-	Χ				
Staymen Rd					0.68	14.0	-	X								
PRV #10	1.09	11.0	-	X									1.33	13.0	-	X
260 Campion Rd									1.04	12.0	-	Χ				
Fenwick Rd					0.59	16.0	-	Χ								
2931 Belgo Rd									1.34	12.0	-	X				
Solly Ct									1.38	13.0	-	Χ				

■ BMID Population = 22,550

#### RECOMMENDED TESTS

 Recommended number of samples per month = 22

(as per Guide for Canadian Drinking Water Quality)

#### **ACTUAL TESTS**

- Total tests by BMID staff (presence/absence) = 13
- Total tests sampled by BMID and tested by Caro Labs = 41
- Total tests sampled in BMID treated distribution system = 54 (Zero Positive Samples)